
स्कूल चॉक, ढला हुआ, सफेद — विशिष्टि
(पहला पुनरीक्षण)

School Chalks, Moulded, White —
Specification
(First Revision)

ICS 97.180

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Printing Inks, Stationery and Allied Product Sectional Committee had been approved by the Chemical Division Council.

This standard was originally published in 1963 and is being revised to update the standard incorporating two amendments issued till date. This standard is intended chiefly to cover the technical provisions relating to the material.

An Indian standard on school chalks will ensure satisfactory quality of school chalks and would be valuable to those concerned with the purchasing of equipment for schools. This standard while prescribes such requirements as would ensure satisfactory quality of school chalks, it is necessary to mention that different results may be obtained on different blackboard surfaces. It is, therefore, suggested that chalks complying with the requirements of this standard may be tried on the surfaces on which they are to be used before making a final choice.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SCHOOL CHALKS, MOULDED, WHITE — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements, methods of sampling and tests for moulded white chalks intended primarily for writing on blackboards in school.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards:

<i>IS No.</i>	<i>Title</i>
IS 1070 : 1992	Reagent grade water (<i>third revision</i>)
IS 460 (Part 1) : 1985	Test sieves: Part 1 Wire cloth test sieves (<i>third revision</i>)

3 REQUIREMENTS**3.1 Materials**

Chalks shall be made from good quality calcined gypsum reasonably free from poisonous and toxic materials, injurious to human beings. They shall be of homogeneous mass free from grease, grit and sandy abrasives.

3.2 Finish

Chalks shall be circular in cross section and tapered at one end, and shall be smooth uniform shape and size. They shall be free from external blow holes.

3.3 Hardness

Chalks shall also produce freely, without scratching or otherwise harming the blackboards, visible and distinct marks that can be easily erased with a piece of dry cloth.

3.4 Chalks shall also conform to the requirements given in Table 1 when tested according to the methods prescribed in Annex A. Reference to the relevant clauses of Annex A is given in column 4 of the table.

Table 1 Requirements for School Chalks, Moulded, White
(*Clause 3.4*)

Sl. No.	Characteristic	Requirement	Method of test, Ref to Clause No. in Annex A
(1)	(2)	(3)	(4)
i)	Calcium sulphate (as $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) Percent by mass, <i>Min</i>	80	A-1
ii)	Free moisture, percent by mass, <i>Max</i>	15	A-2
iii)	Length of sticks, mm	80 ± 3	A-3
iv)	Diameter at thicker end, mm	11 ± 1 tapering by 1.5 – 2.0 mm to 100 mm length	A-3
v)	Mass per 100 sticks, g, <i>Min</i>	500	A-4
vi)	Transverse breaking strength, kg, <i>Min</i>	0.9	A-5

4 SAMPLING

Representative samples of the material shall be drawn and adjudged as prescribed in Annex B.

5 MARKING

5.1 Each container shall have the following information marked on a name plate in a permanent and legible manner in a location where it is accessible and visible:

- a) Name of the material;
- b) Indication of the source of manufacture and trade-mark, if any;
- c) Number of chalks in the container;
- d) Batch number or lot number in code or otherwise; and
- e) Month and year of manufacture.

5.2 BIS Certification Marking

The containers may also be marked with the Standard Mark.

5.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made there under. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 PACKING AND PACKAGING

Chalks shall be packed in suitable paperboard containers which offer adequate protection to the chalks during transportation. Chalks shall be tightly packed in the container and saw dust or other cushioning materials shall be used to fill up the empty spaces to prevent breakage. Unless otherwise, agreed to between the purchaser and supplier, each box shall contain 100 chalks.

ANNEX A

(Clause 3.4)

TESTS FOR SCHOOL CHALKS, MOULDED, WHITE

A-1 DETERMINATION OF CALCIUM SULPHATE CONTENT**A-1.1 Reagents**

A-1.1.1 Quality of Reagents — Pure chemicals and distilled water (see IS 1070) shall be used in the test.

NOTE — 'Pure Chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-1.1.2 Ammonium Acetate Solution — Dissolve 454 g of ammonium acetate in two litres of water. Add ammonium hydroxide to make the solution distinctly ammoniacal.

A-1.1.3 Diatomaceous Silica — Wash kieselguhr free from soluble matter and dry to constant mass at 105°C to 110°C.

A-1.1.4 Ammonium Hydroxide — 20 percent (v/v).

A-1.1.5 Ammonium Wash Solution — Dilute 100 ml of ammonium hydroxide to one litre of distilled water.

A-1.2 Procedure

Grind the sample in a mortar pestle so as to pass through 250 micron IS Sieve (see Note). Place about 4 g of the sieved sample, accurately weighed, in a 600 ml beaker. Add 350 ml of ammonium acetate solution and stir the mixture thoroughly so as to loosen the matter from the bottom of the beaker. Add about 0.2 g of diatomaceous silica, accurately weighed, to the mixture and heat at 70°C on a steam-bath for 30 minutes with frequent stirring. Keep the solution distinctly ammoniacal during this period by adding ammonium hydroxide, if necessary. Filter the mixture through a weighed Gooch crucible applying suction, if necessary. During filtration, stir frequently to keep the diatomaceous earth suspended in the liquid. Wash the residue five times, each with 10 ml of ammonium acetate solution, after thoroughly draining of each washing. Repeat washing with eight 10 ml portions of ammonia wash solution. Dry the crucible in an oven at 70°C to constant mass.

NOTE — For size grading IS sieves conforming to IS 460 (Part 1) : 1985 'Test Sieves: Part-I Wire Cloth Test Sieves' are specified. Where these sieves are not available, other equivalent standard sieves as judged by the aperture may be used.

A-1.3 Calculation

Calcium sulphate, percent by mass =

$$\frac{100 \times \{A - (B - C)\} - M}{A}$$

where,

A = mass of the material taken for the test, in g;

B = final mass of the crucible and the contents after drying, in g;

C = initial mass of the crucible plus mass of diatomaceous silica used as filter aid, in g; and

M = percentage of free moisture (see A-2.2).

A-2 DETERMINATION OF FREE MOISTURE**A-2.1 Procedure**

Grind four chalks in a mortar pestle so as to pass through 1.00 mm IS Sieve [see IS 460 (Part 1)]. Weigh accurately about 10 g of the ground sample and spread it in a layer in a petri dish. Place it in an oven maintained at 100° ± 2°C till constant mass is obtained.

A-2.2 Calculation

Moisture, percent by mass = $\frac{100(A - B)}{A}$

where,

A = mass of the ground material taken for the test, in g; and

B = mass of the material after drying, in g.

A-3 MEASUREMENT OF LENGTH AND DIAMETER**A-3.1 Procedure**

Measure the length and diameter at two ends of only full length chalk by means of calipers and a foot-rule calibrated in millimetres or with a sliding caliper gauge.

A-4 DETERMINATION OF MASS**A-4.1 Procedure**

Weigh 10 chalks, drawn randomly from the same box (see B-2.2) at a time and compute the mass per 100 chalks for each box.

A-4.1.1 The mass computed for each box selected for tests (see B-2.2) shall not differ by more than 2 percent from the average.

A-5 DETERMINATION OF TRANSVERSE BREAKING STRENGTH

A-5.1 Apparatus

The apparatus as shown in Fig. 1 shall be of such construction that a stick of chalk can be supported at two points, 63 mm apart and weight applied by means of a loading anvil midway between the two supports and at right angles to the chalk. The assembly consisting of the loading anvil, spindle, and weight platform, shall weigh approximately 500 g. The weight shall be applied either by the use of lead shot (pre-weighed) or by the use of standard weights.

A-5.2 Procedure

Before testing, dry the chalks at $38^{\circ} \pm 3^{\circ}\text{C}$ for a period of 24 hours to ensure that they are completely dry. Place the chalk in position on the two supporting points so that the central axis of the chalks is horizontal. Then lower the loading anvil carefully until it rests on the chalk in the middle. Add one by one suitable mass carefully to the weight platform until the chalk breaks. The transverse breaking strength of the chalk shall be sum of mass of the loading anvil, spindle, weight platform, and any additional mass on the weight platform.

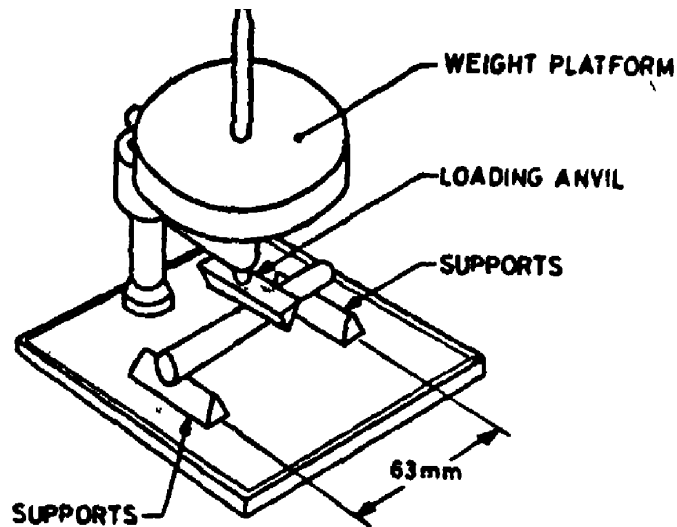


FIG 1. APPRATUS FOR DETERMINATION OF TRANSVERSE BREAKING STRENGTH

ANNEX B

(Clause 6.1)

SAMPLING OF SCHOOL CHALKS, MOULDED, WHITE

B-1 GENRAL PRECAUTIONS

B-1.1 Samples shall be drawn from originally unopened and undamaged boxes.

B-1.2 Samples shall be protected from abnormal exposure to heat, and shall not be allowed to come in contact with any liquid.

B-1.3 Samples shall be handled as little as possible, and contact with wet or sweated hands shall be avoided.

B-2 SCALE OF SAMPLING**B-2.1 Lot**

In any consignment, all boxes of school chalks drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared or known to consist of different batches of manufacture, the boxes belonging to the same batch shall be grouped together and each such group shall constitute a separate lot.

B-2.2 For ascertaining the conformity of the lot to the requirements of the specification, tests shall be carried out of each lot separately. The number of boxes to be selected from lots of different sizes shall be in accordance with Table 2. From each selected box, 10 chalks shall be picked up at random.

Table 2 Scale of Sampling and Permissible Number of Defectives
(Clause B-2.2)

No. of Boxes in the Lot (<i>N</i>)	No. of Boxes to be Selected (<i>n</i>)	Total No. of Chalks to be Selected	Permissible No. of Defective Chalks
(1)	(2)	(3)	(4)
Up to 5	1	10	0
6 „ 50	3	30	1
51 „ 100	5	50	2
101 „ 500	10	100	4
More than 500	15	150	6

B-2.2.1 The boxes shall be selected at random and to ensure randomness of selection, the following procedure is recommended for use:

Count the boxes in a systematic manner as 1, 2, 3,... up to *r* and so no, where, *r* is the integral part of N/n (*N* and *n* being the number of boxes in the lot and number of boxes to be selected respectively). Every *r*th box thus counted shall be selected till the requisite number of boxes is obtained.

From each of the boxes thus selected, 10 chalks shall be picked up blind from different places.

B-3 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-3.1 All the chalks selected according to B-2.2 shall be examined for finish (see 3.2). If the number of defectives found is equal to or less than the corresponding number given in column 4 of Table 2, the lot shall be declared as conforming to the specification requirements in 3.2 and 3.3.

B-3.2 All the chalks selected according to B-2.2 shall than be examined for length of the stick and diameter at the two ends. Any chalk failing to meet the requirement of either length or diameter shall be considered as a defective.

B-3.2.1 If the number of defective chalks found is less than or equal to the corresponding number given in column 4 of Table 2, the lot shall be deemed to have satisfied the dimensional requirement for the chalks.

B-3.3 The chalks in the sample shall be massed in group of 10 and each group shall satisfy the requirement in Table 1, item (v) (see also A-4.1).

B-3.4 Calcium sulphate content and free moisture content shall be determined on a suitable number of chalks after crushing them to the required fineness, as indicated in A-1 and A-2 respectively. Five chalks shall be selected from those got according to B-2.2 and subjected to transverse breaking strength test separately.

B-3.4.1 A lot shall be declared as conforming to the requirements of calcium sulphate, moisture content and transverse breaking strength if all the test results, obtained, as under B-3.4 are found satisfactory.

B-3.5 A lot shall be declared to have met the requirement of the specification if, the stipulations laid down in B-3.1 to B-3.4.1 are all fulfilled.

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